IN THE CLAIMS

Please amend Claims 1, 5-7, 9-10, 12, and 14-19 as follows:

1. (Currently amended) A communications system for determining the position of an object, said system comprising:

an interrogator remote from the object and adapted to:

receive GPS signals from GPS satellites;

for one of the GPS satellites associated with the GPS signals, transmit pre-positioning data for ~~each of~~ the GPS satellite ~~signals~~, including ~~the~~ a pseudorandom noise (PRN) code number, a Doppler frequency offset and a code phase offset and a tracking signal including reference time and frequency information; and

determine ~~the~~ a pseudorange associated ~~with at least one of the GPS signals using~~ a ~~subsequently~~ received correlation snapshot; and

a transponder positioned on the object and adapted to:

receive the pre-positioning data and the tracking signal;

collect RF samples of ~~at least one of~~ the GPS signals ~~associated with one of the PRN code numbers~~;

correlate the RF samples of the GPS signals against ~~code~~ replicas of ~~the~~ a GPS signal based on the PRN code number, the Doppler frequency offset, and the code phase offset in the prepositioning data and the reference time and frequency information ~~for that GPS~~ in the tracking signal to produce the

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correlation snapshot; and

transmit the correlation snapshot to the interrogator.

2. (Original) The system of claim 1 wherein the transponder comprises a two bit sampler for collecting the RF samples.

3. (Original) The system of claim 1 wherein the interrogator is further adapted to transmit a wake-up signal prior to transmitting the pre-positioning data and the tracking signal, and the transponder comprises:

processing circuitry; and

a power subsystem adapted to maintain the processing circuitry in a power-off mode prior to receipt of the wake-up signal.

4. (Original) The system of claim 3 wherein the wake-up signal comprises an unmodulated carrier transmitted at a higher power than the pre-positioning data and the tracking signal.

5. (Currently amended) The system of claim 3 wherein the power subsystem comprises:

a switch connected to a receiver adapted to receive the wake up signal;

a passive standby circuit normally connected to the receiver through the switch; <u>and</u>

a power supply control adapted to provide power to the processing circuitry and to be switched on and off by the passive standby circuit.

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6. (Currently amended) The system of claim 5 wherein the passive standby circuit comprises:

a low pass filter connected to the receiver and adapted to output a voltage, the voltage increasing as a function of time in response to receipt of an RF signal at the resonant frequency of the low pass filter by the receiver; and

a comparator adapted to compare the output voltage to a threshold voltage and to trigger the power supply control an "on" mode when the output voltage is greater than the threshold voltage.

7. (Currently amended) The system of claim ~~3~~ 5 wherein the passive standby circuit comprises:

three passive tuned filters, each connected to the receiver, two ~~receivers~~ of the passive tuned filters being adapted to detect continuous wave tone signals and a third one of the passive tuned filters being adapted to measure the noise and interference in the band of interest, each further adapted to output a corresponding voltage; and

a pair of comparators adapted to combine the three output voltages, compare the result to a threshold voltage and to trigger the power supply control on when the result is greater than the threshold voltage.

8. (Original) The system of claim 1 wherein the code replicas are generated by the transponder at regular offsets of some fraction of a C/A code chip.

9. (Currently amended) The system of claim 1 wherein the correlation snapshot comprises a set of fixed-point correlator sums and a range offset in chips ~~ships~~.

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10. (Currently amended) A method of determining the position of an object comprising:

receiving, at a location remote from the object, GPS signals from GPS satellites;

for one of the GPS satellites associated with the GPS signals, transmitting, at the location remote from the object, pre-positioning data for ~~each of the received~~ the GPS satellite, ~~signals~~ including ~~the~~ a pseudorandom noise (PRN) code number, a Doppler frequency offset and a code phase offset and a tracking signal including reference time and frequency information;

receiving, at the object, the pre-positioning data and the tracking signal;

collecting, at the object, RF samples of ~~at least one of~~ the GPS signals ~~associated with one of the PRN code numbers~~;

correlating, at the object, the RF samples of the GPS signal against code replicas of ~~the~~ a GPS signal based on the PRN code number, the Doppler frequency offset, and the code phase offset in the prepositioning data and the reference time and frequency information ~~for that GPS~~ in the tracking signal to produce a correlation snapshot;

transmitting, at the object, the correlation snapshot;

receiving, at the location remote from the object, the correlation snapshot; and

determining, at the location remote from the object, the pseudorange associated with ~~at least one of the GPS signals using~~ the correlation snapshot.

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11. (Original) The method of claim 10 wherein the RF samples are collected using a two-bit sampler.

12. (Currently amended) The method of claim 10 wherein a plurality of correlators are located at the object and correlating comprises:

obtaining a non-coherent sum of a plurality of integrations using the plurality of correlators spaced one chip apart;

determining ~~the~~ an approximate signal peak from the non-coherent sum;

prepositioning the correlators at a code phase predicted from the approximate signal peak; and

performing an integration to produce a plurality of correlator sums.

13. (Original) The method of claim 12 wherein the correlation takes place within the space of one GPS data bit.

14. (Currently amended) A transponder adapted to be associated with an object and for use in providing data to an interrogator remote from the object, the data ~~for use~~ being used in determining the location of the object, said transponder comprising:

a transceiver adapted to receive signals from the interrogator, the signals including pre-positioning data for acquiring a GPS satellite, ~~signals received by the interrogator~~ including ~~the~~ a pseudorandom noise (PRN) code number, a Doppler frequency offset and a code phase offset and a tracking signal including reference time and frequency information; and

a plurality of correlators adapted to collect RF samples of ~~at least one of the~~

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GPS signals ~~associated with one of the PRN code numbers~~ and to correlate the RF samples ~~of the GPS signal~~ against ~~code~~ replicas of ~~the~~ a GPS signal based on the PRN code number, the Doppler frequency offset, and the code phase offset in the prepositioning data and the reference time and frequency information in the tracking signal ~~for that GPS signal~~ to produce a correlation snapshot; wherein the transceiver is further adapted to transmit the correlation snapshot to the interrogator for determination of a pseudorange.

15. (Currently amended) The transponder of claim 14, further comprising a two bit sampler for collecting the RF samples.

16. (Currently amended) The transponder of claim 14, wherein the interrogator is further adapted to transmit a wake-up signal prior to transmitting the pre-positioning data and the tracking signal, and the transponder comprises:

processing circuitry; and

a power subsystem adapted to maintain the processing circuitry in a power-off mode prior to receipt of the wake-up signal.

17. (Currently amended) The transponder of claim 16 wherein the power subsystem comprises:

a switch connected to a receiver adapted to receive the wake up signal;

a passive standby circuit normally connected to the receiver through the switch; and

a power supply control adapted to provide power to the processing circuitry

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and to be switched on and off by the passive standby circuit.

18. (Currently amended) The transponder of claim 17 wherein the passive standby circuit comprises:

a low pass filter connected to the receiver and adapted to output a voltage, the voltage increasing as a function of time in response to receipt of an RF signal at a ~~the~~ resonant frequency of the low pass filter by the receiver; and

a comparator adapted to compare the output voltage to a threshold voltage and trigger the power supply control on when the output voltage is greater than the threshold voltage.

19. (Currently amended) The transponder of claim ~~16~~ 17 wherein the passive standby circuit comprises:

three passive tuned filters, each connected to the receiver, two of the passive tuned filters being ~~receivers~~ adapted to detect continuous wave tone signals and a third one of the passive tuned filters being adapted to measure ~~the~~ noise and interference in a ~~the~~ band of interest, each further adapted to output a corresponding voltage; and

a pair of comparators adapted to combine the three output voltages, to compare ~~the~~ a result of combining the three output voltages to a threshold voltage and to trigger the power supply control to an "on" state when the result is greater than the threshold voltage.

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Please add new Claims 20-42 as follows:

20. (New) A system for determining the position of an object, said system

comprising a remote transponder positioned on the object, the transponder comprising:

a RF receiver for receiving RF signals from an interrogator; and

a global positioning system (GPS) receiver for receiving signals from GPS satellites;

a plurality of correlators which use the RF signals to generate a correlation snapshot that includes results of correlations between the received GPS signals and replicas of a GPS signal of a selected one of the GPS satellites, wherein the correlation snapshot comprises a set of fixed-point correlator sums and a range offset in chips; and

a transmitter for tranmitting the correlation snapshot for pseudorange determination in the interrogator.

21. (New) The system of claim 20, further comprising an interrogator configured to receive GPS signals from GPS satellite and to transmit the RF signals to the remote transponder, wherein the RF signals comprise (a) time and (b) frequency information, a pseudorandom noise (PRN) code number and code phase information for the selected GPS satellite.

22. (New) The system of claim 21, wherein the RF signals further comprise an interrogation message that directs the remote transponder to generate a correlation snapshot and transmit the correlation snapshot to the interrogator.

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23. (New) The system of claim 22, wherein the remote transponder further comprises:

a plurality of code generators configured to generate the replicas of the GPS signal, wherein the replicas are generated at regular offsets of some fraction of a chip over a range of at least one full chip; and

a phase locked loop device configured to be slaved to a carrier frequency of the RF signals, wherein frequency information of sufficient precision is available for coherent integration of the GPS signal.

24. (New) The system of claim 21, wherein the remote transponder is further configured to generate the correlation snapshot as a set of correlator outputs summed over an integration interval; and to transmit the correlation snapshot to the interrogator as a set of fixed point values.

25. (New) The system of claim 21, wherein the interrogator is further configured to receive the correlation snapshot and to processes the correlation snapshot to obtain position and velocity information related to the remote transponder.

26. (New) The system of claim 20, wherein the plurality of correlators comprises seventy-two correlators grouped into six channels, wherein each channel generates a correlation snapshot of one GPS signal.

27. (New) The system of claim 22, wherein the plurality of correlators comprises twelve correlators grouped into one channel, wherein the remote transponder is sequentially polled to obtain information for each of a plurality of GPS satellites in view of the interrogator.

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28. (New) The system of claim 20, wherein the correlation snapshot is generated by:

generating a non-coherent sum of two one-millisecond integrations using twelve correlators of the plurality of correlators spaced one chip apart;

detecting an approximate signal peak;

predicting a code phase based on the approximate signal peak;

prepositioning the twelve correlators at a code phase predicted from the approximate signal peak;

performing a two millisecond integration using the twelve correlators;

comparing the output of the twelve correlators as a result of the two-millisecond integration; and

predicting a Doppler frequency.

29. (New) The system of claim 29, wherein generating at least one correlation snapshot further comprises:

performing a ten-millisecond integration using the twelve correlators;

normalizing correlator sums resulting from the ten-millisecond integration; and

generating a set of twelve four-bit values, wherein the correlation snapshot comprises the twelve four-bit values and the predicted Doppler frequency.

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30. (New) A method for remotely determining a position of an object, the method

comprising:

transmitting, from an interrogator, a command embedded in RF signals to a remote transponder positioned on the object;

generating a correlation snapshot on the transponder that comprises results of correlations between a received GPS signals and replicas of a GPS signal corresponding to a selected GPS satellite, wherein the correlation snapshot comprises a set of fixed-point correlator sums and a range offset in chips; and

determining a pseudorange at the interrogator based on the correlation snapshot.

31. (New) The method of claim 30, further comprising generating the replicas of the GPS signal at regular offsets of some fraction of a chip over a range of at least one full chip.

32. (New) The method of claim 30, wherein the RF signals comprise one or more of time and frequency and code phase information for the selected GPS satellite.

33. (New) The method of claim 32, wherein the RF signals further comprise a pseudorandom noise (PRN) code number for the selected GPS satellite.

34. (New) The method of claim 33 wherein the RF signals further comprise an interrogation message that directs the remote transponder to generate a correlation snapshot and transmit the correlation snapshot to the interrogator.

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35. (New) The method of claim 30, further comprising slaving a phase locked loop device to a carrier frequency of the RF signals, wherein frequency information of sufficient precision is available for coherent integration of the at least one GPS signal.

36. (New) The method of claim 30, further comprising:

generating the correlation snapshot as a set of correlator outputs summed over an integration interval; and

transmitting the correlation snapshot to the interrogator as a set of fixed point values.

37. (New) The method of claim 30, further comprising:

receiving the correlation snapshot; and

processing the correlation snapshot to obtain position and velocity information related to the remote transponder.

38. (New) The method of claim 30, wherein generating the correlation snapshot comprises generating a correlation snapshot of the GPS signal in each of six channels, wherein each channel comprises twelve correlators.

39. (New) The method of claim 30, further comprising sequentially polling a channel of the remote transponder to obtain information for each of a plurality of GPS satellites in view of the interrogator.

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40. (New) The method of claim 39, wherein the channel comprises twelve

correlators.

41. (New) The method of claim 30, wherein generating the correlation snapshot comprises:

generating a non-coherent sum of two one-millisecond integrations using twelve correlators of the plurality of correlators spaced one chip apart;

detecting an approximate signal peak;

predicting a code phase based on the approximate signal peak;

prepositioning the twelve correlators at a code phase predicted from the approximate signal peak;

performing a two-millisecond integration using the twelve correlators;

comparing the output of the twelve correlators as a result of the two-millisecond integration; and

predicting a Doppler frequency.

42. (New) The system of claim 40, wherein generating the correlation snapshot further comprises:

performing a ten-millisecond integration using the twelve correlators;

normalizing correlator sums resulting from the ten-millisecond integration; and

generating a set of twelve four-bit values, wherein the correlation snapshot comprises the twelve four-bit values and the predicted Doppler frequency.

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